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Gravity Waves in Pluto's Sub-microbar Atmosphere
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Colloquium: Astronomy Colloquia | September 4 | 4-5 p.m. |
LeConte Hall, 2 Le Conte Hall

An Arizona-MIT team observing on the MMT on Mt. Hopkins recorded a grazing occultation of a star by Pluto on 2007 March 18 at unprecedented signal-to-noise. Data taken simultaneously at 1.6 micrometers (H band) and in the red end of the visible band (about 0.8 micrometers) show large-scale, nearly limb-aligned density fluctuations in Pluto's atmosphere over a pressure range of ~0.1-0.7 microbars (0.01 to 0.07 Pa; radius range of 1500 to 1350 km). The features are fully resolved and, importantly, achromatic. The data are good enough to show a spectral cutoff moving up in wavenumber with decreasing altitude in Pluto's atmosphere. We apply scintillation theory to the data. We find that the cutoff agrees with the theory for dissipation of gravity waves by diffusion of heat and momentum. Except for much lower characteristic frequencies, Pluto's high atmosphere resembles the Earth's in some respects.

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